

# SERIES HSD25

**NorthStar™ brand**

## Harsh Duty Optical Encoder

### Key Features

- Compact Hubshaft Design with Field Replaceable Shaft Isolators
- Unbreakable Code Disc up to 3600PPR
- IP67 Sealing
- Anodized Aluminum, Stainless Steel, or Nickel Plated Housing



## SPECIFICATIONS

### STANDARD OPERATING CHARACTERISTICS

**Code:** Incremental

**Resolution:** 1 to 3600 PPR (pulses/revolution)

**Format:** Two channel quadrature (AB) with optional Index (Z), and complementary outputs

**Phase Sense:** A leads B for CCW shaft rotation viewing the shaft clamp end of the encoder

**Quadrature Phasing:** For resolutions to 625PPR: 90° ± 15° electrical; For resolutions over 625 PPR: 90° ± 30° electrical

#### Symmetry:

For resolutions to 1024PPR: 180° ± 18° electrical

For resolutions over 1024PPR: 180° ± 25° electrical

**Waveforms:** Squarewave with rise and fall times less than 1 microsecond into a load capacitance of 1000 pf

### ELECTRICAL

**Input Power:** 5-26VDC. 50 mA max., not including output loads.

**Outputs:** 2N2222, ET7272, ET7273

**Frequency Response:** 125 kHz (data & index)

**Termination:** 6, 7, or 10 pin MS Connector; 5 or 8 Pin M12 Connector; Cable exit w/seal

#### Mating Connector:

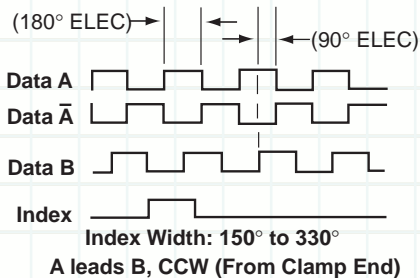
6 pin, style MS3106A-14S-6S (MCN-N4)

7 pin, style MS3106A-16S-1S (MCN-N5)

10 pin, style MS3106A-18-1S (MCN-N6)

10 pin, NEMA 4 style (MCN-N6N4)

### DATA AND INDEX Not all complements shown A shown for reference



### MECHANICAL

**Shaft Material:** 303 stainless steel (passivated)

**Bore Diameter:** 3/8", 10mm, 1/2", 5/8", 3/4".

Insulated inserts provided

**Starting torque:** 6.5 in-oz. maximum (at 25°C)

**Bearings:** 61805-2RZ

**Bearing life:** 5 x 10<sup>8</sup> revs at rated shaft Loading, 5 x 10<sup>11</sup> revs at 10% of rated shaft loading. (manufacturers' specs)

**Housing and cover:** Hard Anodized Aluminum.

Also available in Electroless Nickel finish and

Stainless Steel. Tether Available

**Disc material:** Plastic

**Weight:** 20 ounces, typical

### ENVIRONMENTAL

**Operating Temperature:** -40 to 100°C

**Storage temperature:** -40 to 100°C

**Shock:** 50G's for 11msec duration

**Vibration:** 5 to 2000Hz @ 20 G's

**Humidity:** 100%

**Enclosure Rating:** IP67

## Ordering Information

To order, complete the model number with code numbers from the table below:

Code 1: Model		Code 2: PPR		Code 3: Bore Size		Code 4: Output Format		Code 5: Termination		Code 6: Options		Code 7: Special Options	
HSD 25□□□													

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## ELECTRICAL CONNECTIONS

### 6, 7 & 10 Pin MS Connectors and Cables

Connector & mate/accessory cable assembly pin numbers and wire color information is provided here for reference. Models with direct cable exit carry the color coding as shown in the right hand column.

Encoder Function	Cable # 108594-6 Pin Single Ended		Cable # 108595-7 Pin Single Ended		Cable # 108596-7 Pin Diff Line Drv w/o ldx		Cable # 1400635- or 109209- (NEMA4) 10 Pin Diff Line Drv w/ldx		Cable #115901-* 12 Pin CW		Cable Exit with Seal
	Pin	Wire Color	Pin	Wire Color	Pin	Wire Color	Pin	Wire Color	Pin	Wire Color	Wire Color
Sig. A	E	BRN	A	BRN	A	BRN	A	BRN	5	BRN	GRN
Sig. B	D	ORG	B	ORG	B	ORG	B	ORG	8	ORN	BLU
Sig. Z	C	YEL	C	YEL	—	—	C	YEL	3	YEL	ORG
Power +V	B	RED	D	RED	D	RED	D	RED	12	RED	RED
Com	A	BLK	F	BLK	F	BLK	F	BLK	10	BLK	BLK
Case	—	—	G	GRN	G	GRN	G	GRN	9	—	WHT
N/C-SLD	F	—	E	—	—	—	E	—	7	—	—
Sig. A	—	—	—	—	C	BRN/WHT	H	BRN/WHT	6	BRN/WHT	VIO
Sig. B	—	—	—	—	E	ORG/WHT	I	ORG/WHT	1	ORN/WHT	BRN
Sig. Z	—	—	—	—	—	—	J	YEL/WHT	4	YEL/WHT	YEL

Note: "MS" type mating connectors and prebuilt cables are rated NEMA12. "M12" Cable assemblies are rated IP67

For watertight applications, use NEMA4 10 pin cable & connector 109209-XXXX.

### 5 & 8 Pin M12 Accessory Cables when Code 5= H or J

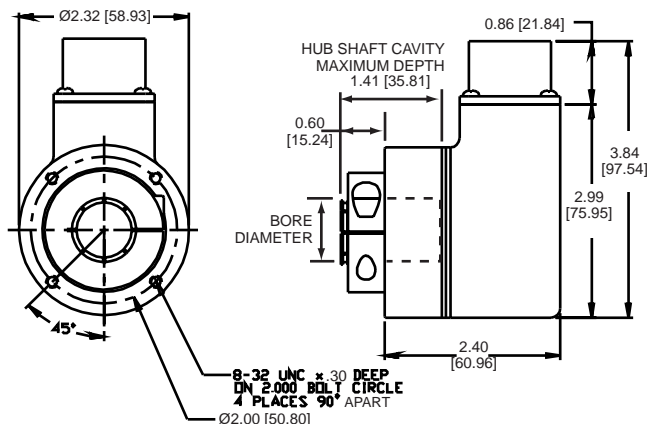
Connector pin numbers and cable assembly wire color information is provided here for reference.

Encoder Function	Cable # 112859-5 Pin Single Ended		Cable # 112860-8 Pin Single Ended		Cable # 112860-8 Pin Differential	
	Pin	Wire Color	Pin	Wire Color	Pin	Wire Color
Sig. A	4	BLK	1	BRN	1	BRN
Sig. B	2	WHT	4	ORG	4	ORG
*Sig. Z	5	GRY	6	YEL	6	YEL
Power +V	1	BRN	2	RED	2	RED
Com	3	BLU	7	BLK	7	BLK
Sig. A	—	—	—	—	3	BRN/WHT
Sig. B	—	—	—	—	5	ORG/WHT
*Sig. Z	—	—	—	—	8	YEL/WHT

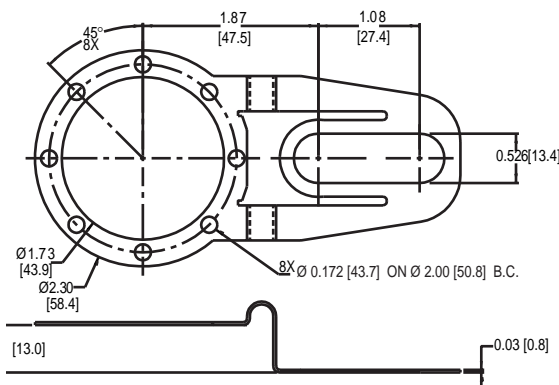
\* Index not provided on all models. See ordering information

**Cable Configuration:** PVC jacket, 105 °C rated, overall foil shield; 24 AWG conductors, minimum

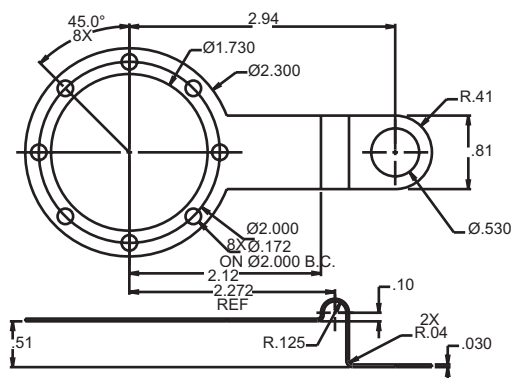
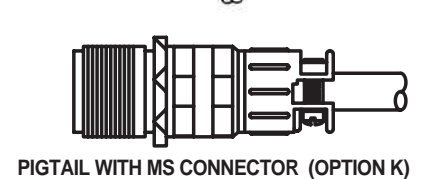
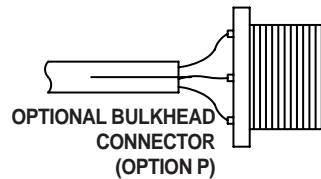
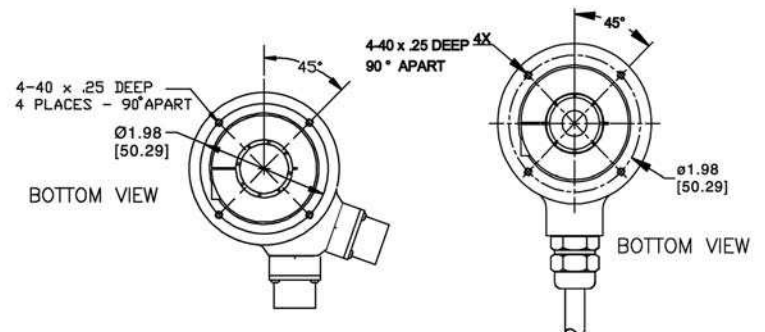
## DIMENSIONS inches [mm]



Standard Housing



Slotted Tether



Single Point Tether



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